NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: xx/xx/2021

Region: Washington Regional Office
County: Wayne
NC Facility ID: 9600250
Inspector's Name: Kurt Tidd
Date of Last Inspection: 06/26/2020
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Wayne County Municipal Solid Waste Landfill

Facility Address:
Wayne County Municipal Solid Waste Landfill
460B South Landfill Road
Dudley, NC 28333

SIC: 4953 / Refuse Systems
NAICS: 562212 / Solid Waste Landfill

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 15A NCAC 02D .0516, 02D .0521, 02D .0524, 02D .1110, 02D .1111, and 02D .1806
NSPS: Subpart XXX
NESHAP: 40 CFR 61 Subpart M, 40 CFR 63 Subparts AAAA and ZZZZ
PSD: N/A
PSD Avoidance: N/A
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Tim Rogers Solid Waste Director (919) 689-2994 460B South Landfill Road Dudley, NC 28333	Craig Honeycutt County Manager (919) 731-1435 PO Box 227 Goldsboro, NC 27530	Tim Rogers Solid Waste Director (919) 689-2994 460B South Landfill Road Dudley, NC 28333

Application Data

Application Number: 9600250.18A
Date Received: 12/19/2018
Application Type: Renewal
Application Schedule: TV-Renewal/Modification

Existing Permit Data
Existing Permit Number: 08885/T04
Existing Permit Issue Date: 06/16/2015
Existing Permit Expiration Date: 05/31/2020

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2019	---	0.0100	9.51	0.0100	---	2.70	1.06 [Toluene]
2018	---	---	7.57	---	---	2.15	0.8395 [Toluene]
2017	---	---	6.86	---	---	2.15	0.8430 [Toluene]
2016	---	---	7.66	---	---	1.92	0.7535 [Toluene]
2015	---	---	5.32	---	---	1.35	0.5305 [Toluene]

Review Engineer: Joshua L. Harris

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 08885/T05
Permit Issue Date: xx/xx/2021
Permit Expiration Date: xx/xx/2026

1. Purpose of Application

The Wayne County Municipal Solid Waste Landfill is an active municipal solid waste (MSW) landfill located in Dudley, Wayne County. The landfill timely submitted permit Application No. 9600250.18A and is requesting renewal of their current Title V Air permit, with modifications to permit conditions as necessary due to regulatory changes and testing outcomes. The application will go through the 30-day public notice and 45-day EPA review periods prior to issuance.

The facility contact for this application is Tim Rogers, Solid Waste Manager, (919-689-2994). A consultant, Smith Gardner, Inc. (S+G), was used to prepare the application. The contact at S+G is Matt Lamb, Senior Scientist, (919-828-0577).

2. Facility Description

The Wayne County Municipal Solid Waste Landfill operates under Solid Waste Permit No. 9606-MSWLF and consists of three landfill sites. Units 1 and 2 are currently closed (ID Nos. ES-01, ES-02), and a third Subtitle-D landfill, Unit 3 (ID No. ES-03), is active with a projected closure in CY2040 at current waste acceptance rates. The facility and began accepting waste in 1974 and accepts construction and demolition (C&D) waste which is placed on top of the closed Unit 1. The landfill has a design capacity greater than 2.5 million Mg, and 2.5 m^3.

Landfill gas (LFG) generated by the decomposition of MSW is collected by an installed gas collection and control system (GCCS). The collected gas is routed either to a flare (ID No. CD-F1) for incineration, or through a treatment system (ID No. CD-Treatment) and sent to a landfill gas to energy (LFGTE) facility, MP Wayne, LLC (Facility ID 9600269) where the gas is combusted for electricity generation. The landfill owns and operates the gas treatment system.

3. Application Chronology

12/19/18 The Division of Air Quality (DAQ), Raleigh Central Office (RCO), received the permit renewal application, Application No. 9600250.18A, and forwarded a copy to the Washington Regional Office (WaRO). The application contained the required forms, and there was no request for confidentiality. No application fees were required.

01/02/19 RCO sent the facility a letter acknowledging receipt of permit application.

03/20/19 The results of the Tier 2 testing were received by DAQ.

06/27/19 Joshua Harris sent Mary Kennamer, Staff Engineer at S+G, an email requesting that the facility submit an addendum to the permit application to include any requests for changes to be made to permit conditions based on testing. Mr. Harris also requested that Ms. Kennamer verify the contact information contained on the submitted application "Form A" and resubmit the form as necessary with corrected contact information.

08/22/19 Mary Kennamer responded with a request from the facility to treat the GCCS as a voluntary system based on the results of Tier 2 testing. This request was treated as an applicability determination (Tracking No. 3462).

08/28/19 DAQ issued an applicability determination (Tracking No. 3462) regarding the facility's request to treat the GCCS as a voluntary system. DAQ determined that the system can be treated as a voluntary system for the purposes of compliance with NSPS XXX, but that the system is still a required system for the purposes of compliance with MACT AAAA. DAQ recommended that the facility request further determination from EPA if there are further questions.

11/06/19 DAQ reviews and approves the Tier 2 results.

11/11/19 Joshua Harris spoke with Matt Lamb regarding the status of any request for a determination from EPA. Mr. Lamb indicated that the facility was working on making a request.

02/11/20 Joshua Harris spoke with Matt Lamb regarding the status of a request to EPA for a determination. Mr. Lamb indicated that the landfill is not currently planning to pursue that request. Mr. Harris asked that Mr. Lamb verify the landfill's plan to request a determination, otherwise, the permit application will be processed.

03/09/20 Through 07/20/20 Multiple emails were exchanged between Matt Lamb and David McNeal, EPA Region 4, regarding a determination for the facility's request to treat the GCCS as a voluntary system. Mr. McNeal ultimately agreed with DAQ's determination that the GCCS can be treated as voluntary for the purposes of NSPS XXX, but cannot be considered voluntary for compliance with MACT AAAA. Therefore, the facility is required to continue complying with the monitoring, record keeping, and reporting provisions of MACT AAAA.

07/20/20 Through 09/24/20 Multiple emails and phone conversations between Joshua Harris and Matt Lamb regarding the facility's plan for compliance with NSPS XXX and MACT AAAA. Mr. Lamb stated that the facility has decided to treat the system as voluntary for the purposes of compliance with NSPS XXX, and will continue to conduct Tier 2 tests, and that the facility will continue to comply with the monitoring, recordkeeping, and reporting requirements of MACT AAAA. Mr. Lamb stated that the facility will begin complying with the recently promulgated MACT AAAA requirements immediately rather than waiting for the September 28, 2021 compliance date.

11/19/20 Joshua Harris sent electronic copies of the draft permit and review documents to Booker Pullen, Samir Parekh, and Betsy Huddleston for comments.

11/24/20 Booker Pullen replied with minor comments on the draft review document.

11/30/20 Kurt Tidd replied with no comments from the WaRO. Also, Samir Parekh replied with no comments.

12/01/20 Joshua Harris sent electronic copies of the draft permit and review documents to Craig Honeycutt, Tim Rogers, and Matt Lamb for comments.

01/04/21 Joshua Harris received a memo from Matt Lamb with questions. DAQ's responses to those questions can be found in Appendix A of this document.

Xx/xx/21 30-day public notice and 45-day EPA review periods begin.

Xx/xx/21 Public notice period ends; [comments received].

Xx/xx/21 EPA review period ends; [comments received].

Xx/xx/21 Air Quality Permit Revision No. 08885T05 issued.

4. Table of Changes to Existing Permit No. 08885T04

Page No.	Section	Description of Changes
Cover and Throughout	Cover and Throughout	• Updated letterhead. • Changed name of Responsible Official. • Updated Responsible Official address. • Changed dates and permit revision numbers.
Attachment to Cover	Attachment to Cover	Added capacity to description of the emergency generator (ID No. IES-2).
3	1 (Table)	• Updated applicable regulatory citations to show the landfill units (ID Nos. ES-01, ES-02, and ES-03) are subject to NSPS Subpart XXX, and 40 CFR 61 Subpart M. • Added note to table showing that the GCCS and control devices are voluntary and not subject to the NSPS monitoring requirements, but that the GCCS is required for compliance with MACT AAAA.
4	2.1 A. (Table)	• Removed row for NSPS Subpart WWW. • Added row for NSPS Subpart XXX and updated requirements. • Added row for Asbestos with 40 CFR 61 Subpart M requirements. • Updated MACT Subpart AAAA requirements.
5-8	2.1 A.3.	Removed NSPS Subpart WWW conditions and replaced with NSPS Subpart XXX conditions.
8-10	2.1 A.4.	Inserted 15A NCAC 02D .1110 conditions for 40 CFR 61 Subpart M.
10-22	2.1 A.5.	Updated MACT Subpart AAAA conditions to reflect the most recently promulgated requirements.
22	2.1 A.6.	Renumbered 15A NCAC 02D .1806 condition.
23	3	Updated General Conditions to the most recent version (version 5.5, 08/25/2020)

5. Changes in Equipment

There are no changes to permitted equipment, control devices, or insignificant activities. Title V Equipment Editor (TVEE) has been updated to reflect changes to applicability of NSPS, NESHAP, and MACT regulations, as well as to include the capacity of the emergency generator (ID No. IES-2).

The facility's permitted emission sources are as follows:

Emission Source ID No.	Emission Source Description	Control Device ID No.	Control Device Description
ES-01 ES-02 ES-03 NSPS XXX, MACT AAAA, 40 CFR 61 Subpart M	Municipal Solid Waste Landfill (ES-01 and ES-02 are closed units. ES-03 is active)	CD-GCCS1 CD-Treatment CD-F1	Landfill gas collection and control system One landfill gas treatment system One landfill gas-fired candlestick-type flare (30 million Btu per hour heat input capacity)

The facility's insignificant/exempt activities are as follows:

Emission Source ID No.	Emission Source Description
IES-1	Leachate storage (maximum capacity 5.7 million gallons)
IES-2 GACT ZZZZ	Emergency/Backup Propane Generator (25kW)

6. NSPS, NESHAP, PSD, 112(r), CAM & Attainment Status

- **NSPS** –

  - ✓ The MSW landfills (ID Nos. ES-01, ES-02, ES-03) are subject to 40 CFR 60, Subpart XXX "Municipal Solid Waste Landfills that Commenced Construction, Reconstruction or Modification After July 17, 2014," due to the recent construction of the recent vertical expansion. The landfill did complete Tier 2 testing demonstrating that the NMOC emission rate is less than the 34 Mg/yr threshold, and the landfill's GCCS will be considered voluntary for the purposes of this subpart. The facility has chosen to continue conducting Tier 2 tests for compliance with NSPS XXX, even though the DAQ and EPA have determined that the GCCS cannot be considered as a voluntary system for the purposes of complying with MACT AAAA.

  - ✓ The MSW landfills (ID Nos. ES-01, ES-02, ES-03) are NOT subject to 40 CFR 60, Subpart WWW "Municipal Solid Waste Landfills," since it is superseded by NSPS Subpart XXX. The NSPS Subpart WWW requirements have been removed as this regulation is no longer applicable.

  - ✓ The emergency generator (ID No. IES-2) is NOT subject to 40 CFR 60, Subpart JJJJ "Stationary Spark Ignition Internal Combustion Engines" because the engine was constructed in 2004, which is prior to the applicability date of the NSPS regulation.

- **NESHAP** –

  - ✓ The MSW landfills (ID Nos. ES-01, ES-02, and ES-03) are subject to 40 CFR 63, Subpart AAAA "Municipal Solid Waste Landfills." The landfill's mass and volume exceed the 2.5 million Mg and 2.5 million m^3 thresholds. While the landfill's NMOC emission rate was recently determined to be less than 50 Mg/yr, the Permittee previously triggered and began to comply with MACT AAAA requirements. EPA has determined in the past that once a landfill begins to comply with these requirements, it cannot cease complying with the requirements until the equipment removal criteria have been fulfilled. Therefore, for the purposes of complying this subpart, the requirements will remain in the facility's permit, and the facility will be required to continue operating the GCCS as a non-voluntary system.

  - ✓ The facility is subject to 40 CFR 61, Subpart M "National Emission Standard for Asbestos," since it is an active disposal site for asbestos-containing waste.

  - ✓ The emergency generator (ID No. IES-2) is subject to 40 CFR 63, Subpart ZZZZ "Reciprocating Internal Combustion Engines" and is considered an existing emergency engine under this regulation.
- **PSD –** PSD is not impacted by this application.

  - ✓ Wayne County has triggered increment tracking under PSD for PM_{10}, SO_2, and NOx. This permitting action is neither expected to consume nor expand any increments.

- **112(r) –** The facility does not store any of the listed 112(r) chemicals in amounts that exceed the threshold quantities. Therefore, the facility is not required to maintain a written Risk Management Plan (RMP).

- **CAM –** CAM does not apply since the facility's sources are regulated by NSPS and MACT regulations that were proposed after November 15, 1990 and control the pollutants which would be subject to CAM.

- **Attainment status** – Wayne County is in attainment for all criteria pollutants.

7. Regulatory Review

The facility is subject to the following air quality regulations in addition to the General Conditions:

- 15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources
- 15A NCAC 02D .0521: Control of Visible Emissions
- 15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart XXX
- 15A NCAC 02D .1110: National Emission Standards for Hazardous Air Pollutants, 40 CFR 61, Subpart M
- 15A NCAC 02D .1111: Maximum Available Control Technology, 40 CFR 63, Subpart AAAA
- 15A NCAC 02D .1806: Control and Prohibition of Odorous Emissions

The following permit conditions are being removed as part of this permit application:

- 15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart WWW

15A NCAC 02D .0516: Sulfur Dioxide Emissions from Combustion Sources

Sulfur dioxide emissions from the facility's combustion sources shall be no more than 2.3 pounds per million Btu heat input. For LFG combustion, using AP-42 Ch. 2.4, Equations 3, 4, and 7, the SO_2 emission rate was determined to be 0.0169 pounds per million Btu at the flare's capacity of 30 mmBtu/hr. Continued compliance is expected.

15A NCAC 02D .0521: Control of Visible Emissions

Visible emissions from the facility's LFG-fired flare (ID Nos. CD-F1) shall not exceed 20% opacity when averaged over a six-minute period. DAQ inspectors have not observed visible emissions in excess of the limit during any site visit. Additionally, DAQ has not received any complaints of visible emissions from nearby residents. Continued compliance is expected.

15A NCAC 02D .0524: New Source Performance Standards, 40 CFR 60, Subpart XXX

The existing 15A NCAC 02D .0524 permit condition for NSPS Subpart WWW be removed as it is no longer be applicable

As previously stated, the MSW landfill recently became subject to 40 CFR 60, Subpart XXX. The NMOC emission rate was calculated using the Tier 2 methodology and was demonstrated to be below the 34 Mg/yr threshold which would require installation and operation of a GCCS. The facility does have a GCCS installed, which was previously installed while the landfill was subject to NSPS WWW. When the facility was subject to NSPS WWW, the Tier 1 calculation showed that the landfill's NMOC emission rate exceeded the 50 Mg/yr threshold. The option to conduct a Tier 2 sample was not exercised, so the landfill became subject to the requirement to install and operate a GCCS, and also triggered the requirements of MACT AAAA.

Once the applicability of NSPS XXX was triggered, the landfill elected to conduct Tier 2 testing to determine a site-specific NMOC concentration. The test results demonstrated that the landfill's NMOC emission rate is below the 34 Mg/yr threshold for the requirement to install and operate a GCCS under NSPS XXX. Therefore, the landfill is requesting that the permit conditions for NSPS XXX be written such the operation of the GCCS is considered voluntary, and that the monitoring requirements for the GCCS, flare, and treatment system not be included.

On August 28, 2019, DAQ issued an applicability determination (Tracking No. 3462) to the facility stating that since an entirely new Subpart was triggered, the landfill has demonstrated that the NMOC emission rate does not exceed 34 Mg/yr threshold, therefore the existing GCCS could be treated as a voluntary system for the purposes of complying with NSPS XXX. This determination was based on a statement made in EPA's responses to public comments. In the "Responses to Public Comments on EPA's Standards of Performance for Municipal Solid Waste Landfills: Proposed Rules" dated July 2016, EPA received and responded to a number of comments regarding the transition methods for landfills trigger NSPS XXX applicability but were previously subject to the GCCS requirements of NSPS WWW. One such comment made by Kerry Kelly, Senior Director of Federal Affairs for Waste Management, Inc. (Document Control No. EPA-HQ-OAR-2003-0215-0100.1; Excerpt No. 57), EPA responded that "…any landfill that undergoes a modification, as defined in the final landfills rules, would become subject to subpart XXX upon commencing construction on the lateral or vertical expansion. Thus, the compliance obligations of a landfill that transitions from subpart WWW to subpart XXX applicability on the basis of modification are in subpart XXX."

While DAQ believes the GCCS can be considered as a voluntary system with regard to NSPS XXX, there is no mechanism that would allow the facility to discontinue operation of the GCCS under MACT AAAA other than the system removal criteria, which the facility does not meet. The facility

sought additional clarification from EPA. Mr. Dave McNeal, of EPA Region 4, provided an informal response stating that the EPA's Office of Air Quality Planning and Standards (OAQPS) and Office of General Counsel agreed with the DAQ determination. Following these determinations, the landfill has requested to have the permit written in such a way that the GCCS is considered voluntary for the purposes of compliance with NSPS XXX, and mandatory for the purposes of compliance with MACT AAAA.

A permit condition for NSPS Subpart XXX is included in this permit revision. The facility is required to continue making demonstrations of the annual NMOC emission rate, keep appropriate records, and submit periodic reports. Upon exceeding the 34 Mg/yr threshold for NMOC emissions, the landfill will trigger the requirements to submit a GCCS design plan for approval, and subsequently install and operate the GCCS. Since a system is already operating for compliance with MACT AAAA, and a design plan has been approved, it is assumed that these requirements will be met, and that the landfill will be able to easily transition into the monitoring, recordkeeping, and reporting requirements for the GCCS. Continued compliance is expected.

15A NCAC 02D .1110: National Emission Standards for Hazardous Air Pollutants, 40 CFR 61, Subpart M

The facility is an active disposal site for asbestos-containing wastes, therefore it is subject to the requirements of this regulation. To comply, the facility must adhere to a general set of work practices which may include ensuring there are no visible emissions at the disposal site, covering waste daily with at least six inches of compacted non-asbestos material or use another dust suppression agent, or the landfill may propose alternative methods for DAQ approval. The facility will be required to post signage and barriers if the method of compliance does not include covering the asbestos-containing waste. Closed portions of the landfill which have previously received asbestos-containing waste are also subject and are required to comply with the requirements of 40 CFR 61.151 for inactive waste disposal sites. The facility's current Solid Waste permit contains a requirement for the facility to comply with the requirements of 40 CFR 61, Subpart M, and continued compliance is expected.

15A NCAC 02D .1111: Maximum Available Control Technology, 40 CFR 63, Subpart AAAA

The MSW landfills (ID Nos. ES-01, ES-02, and ES-03) are the subject sources. The GCCS cannot be treated as a voluntary system for compliance with MACT Subpart AAAA as previously explained. Compliance with MACT AAAA is achieved by complying with the requirements operate the GCCS and route collected gas to the flare or the treatment system for incineration or subsequent beneficial use. The facility is required to develop a site-specific treatment system monitoring plan, and must monitor the system, keep appropriate records, and submit semi-annual reports.

Any reports and notifications submitted for compliance when the facility was subject to NSPS WWW can be used to demonstrate compliance with MACT AAAA, and any higher operating values that were previously approved for wellhead temperatures also still apply. The landfill is not required to resubmit these reports, but is required to submit a certification that these reports have been submitted previously. Compliance is expected.

15A NCAC 02D .1806: Control and Prohibition of Odorous Emissions

This is applicable facility wide. DAQ inspectors have not noted odors beyond the facility's property boundary, and neither DAQ nor the facility have received any odor complaints from nearby residents. Continued compliance is expected.

8. Other Regulatory Requirements

- A Zoning Consistency Determination is NOT required for this permit application.
- The application was sealed by Stacey A. Smith, who is a registered Professional Engineer in the State of North Carolina (Seal #023002).
- No permit application fees were required for this application.

9. Air Toxics

The facility first evaluated toxic air emissions in 2005 as a result of a Notice of Violation issued by DAQ. The landfill evaluated the peak emission rates through the end of life which was projected to be CY2038 at the time, and the LFG generation rate at the peak was 17,149,545 m^3/yr. For this application, the facility used LandGEM to determine the peak LFG generation rates or each landfill unit. The projected peak for Units 1 and 2 occurred in CY2018, and projected the peak for Unit 3 at closeout in CY2040. The sum of these LFG generation rates is 16,252,566 m^3/yr.

The landfill previously used site-specific concentrations for evaluating toxics, but used the default concentrations from AP-42 Chapter 2.4 [November 1998] for this application. This resulted in a slight change to the toxics evaluation below. The landfill is evaluated at the peak LFG generation rate previously stated, and the flare is evaluated at its maximum capacity of 1,100 SCFM.

The following example calculation is for the emission of hydrochloric acid (HCl) created from the combustion of the chlorine compounds in the landfill gas-fired flare. The best methods to estimate emission are mass balance methods using site specific data on total chloride [expressed in ppmv as the chloride ion (Cl^-)]. [AP-42, Section 2.4.4.2 – Controlled Emissions]

- Flare design rating = 1,100 ft^3/minute (or 31.15 m^3/min = 1,869 m^3/hour)
- Methane is only 55% of this gas stream (1,027.95 m^3/hour)
- Q_{Cl^-} = Emission rate of chloride ions, m^3/hour
- C_{Cl^-} = Concentration of chloride ions (42.0 ppmv, AP-42 default value)
- Multiplication factor for 55% methane concentration in landfill gas = 100/55 (1.82)
- Molecular weight of chloride ions = 35.45 g/gmole

$$Q_{Cl^-} = 1.82 \times Q_{CH_4} \times \left(\frac{C_{Cl^-}}{1\times10^6}\right) \text{ (AP-42, Equation 3)}$$

$$Q_{Cl^-} = 1.82 \times 1{,}027.95 \frac{m^3}{hour} \times \left(\frac{42.0 \text{ parts}}{1\times10^6}\right) = 0.079 \frac{m^3}{hour}$$

The mass of the pre-combustion chloride ions present in the methane were found using Equation 4 of AP-42, Section 2.4.4.2.

$$UM_{Cl^-} = 0.079 \frac{m^3}{hour} \times \left[\frac{35.45 \text{ g/gmol} \times 1 \text{ atm}}{8.205 \times 10^{-5} \frac{m^3 - atm}{gmol - K} \times 1000 \frac{g}{kg} \times (273 + 25℃) \text{ K}} \right] \times 2.2 \frac{pounds}{kg}$$

$$UM_{Cl^-} = 0.25 \frac{pounds}{hour}$$

To calculate the HCl from the chloride ions, Equation 10 of Section 2.4-8 was used.

$$HCl_{emissions} = UM_{Cl^-} \times \frac{\eta_{col}}{100} \times 1.03 \times \frac{\eta_{cnt}}{100}$$

Where:

UM_{cl} = Uncontrolled mass emission of Cl^- ions
η_{col} = Collection efficiency of the landfill gas collection system, percent (100%)*
η_{cnt} = Control efficiency of the landfill gas control flare (100%)*
* To calculate worst-case HCl emissions, the facility assumes that 100% of the generated Cl^- ions are collected and converted to HCl rather than using the default collection and control efficiencies.

$$HCl_{emissions} = 0.25 \frac{lb\ Cl^-}{hour} \times \frac{100}{100} \times 1.03 \times \frac{100}{100} = 0.258 \frac{lb\ HCl}{hour}$$

The total emission rates of other pollutants from the landfill and flare are calculated using AP-42 Section 2.4-6 Equation 5:

$$CM_P = \left[UM_P \times \left(1 - \frac{\eta_{col}}{100}\right)\right] + \left[UM_P \times \frac{\eta_{col}}{100} \times \left(1 - \frac{\eta_{cnt}}{100}\right)\right]$$

Where:

CM_p = Controlled mass emissions of pollutant
UM_p = Uncontrolled mass emission of pollutant
η_{col} = Collection efficiency of the landfill gas collection system, percent (75% AP-42 default)
η_{cnt} = Control efficiency of the landfill gas control flare
(98% for halogenated species; 99.7% for non-halogenated species [AP-42])

Using Benzene as an example, utilizing Equations 3 and 4 above, the uncontrolled emission rate of benzene would be 218.66 pounds per year. Therefore:

$$CM_B = \left[UM_B \times \left(1 - \frac{\eta_{col}}{100}\right)\right] + \left[UM_B \times \frac{\eta_{col}}{100} \times \left(1 - \frac{\eta_{cnt}}{100}\right)\right]$$

$$CM_B = \left[218.66 \frac{lb}{year} \times \left(1 - \frac{75}{100}\right)\right] + \left[218.66 \frac{lb}{year} \times \frac{75}{100} \times \left(1 - \frac{99.7}{100}\right)\right]$$

$$CM_B = \left[54.67 \frac{lb}{year}\right] + \left[0.49 \frac{lb}{year}\right]$$

$$CM_B = 55.16 \frac{lb\ Benzene}{year}$$

The total pollutant emission rates in the table below are slightly higher than those calculated using this method since the flare's emission rates are calculated at its maximum capacity.

The projected toxic air pollutant emission rates through CY2040 were compared to their respective TPERs from 02Q .0711(a) are as follows:

Toxic Air Pollutant	Averaging Period	Landfill Emissions	Flare Emissions	Total	TPER	Modeling Required?
1,1,1-Trichloroethane (methyl chloroform)	lb/day	6.43×10^{-2}	5.18×10^{-3}	6.95×10^{-2}	250	No
	lb/hr	2.68×10^{-3}	2.20×10^{-4}	0.002895	64	No
1,1,2,2-Tetrechloroethane	lb/yr	68.27	5.50	73.77	430	No
1,1-Dichloroethene (vinylidene chloride)	lb/day	1.95×10^{-2}	1.57×10^{-3}	2.11×10^{-2}	2.5	No
1,2-Dibromoethane (ethylene dibromide)	lb/yr	6.88×10^{-2}	5.55×10^{-3}	7.44×10^{-2}	27	No
1,2-Dicholoroethane (ethylene dichloride)	lb/yr	14.87	1.20	16.07	260	No
2-Butanone (MEK)	lb/day	0.51	6.20×10^{-3}	0.52	78	No
	lb/hr	2.14×10^{-2}	2.60×10^{-4}	2.16×10^{-2}	22.4	No
4-Methyl-2-pentanone (MIBK)	lb/day	0.19	2.27×10^{-3}	0.192	52	No
	lb/hr	7.83×10^{-3}	9.47×10^{-5}	7.93×10^{-3}	7.6	No
Acrylonitrile	lb/day	0.34	4.08×10^{-3}	0.344	0.4	No
	lb/hr	1.40×10^{-2}	1.70×10^{-4}	1.42×10^{-2}	0.22	No
Benzene	lb/yr	54.67	0.66	55.33	8.1	**YES**
Carbon disulfide	lb/day	4.43×10^{-2}	5.36×10^{-4}	4.48×10^{-2}	3.9	No
Carbon tetrachloride	lb/yr	0.23	2.73×10^{-3}	0.232	460	No
Chlorobenzene	lb/day	2.82×10^{-2}	2.28×10^{-3}	3.05×10^{-2}	46	No
Chloroform	lb/yr	1.31	0.11	1.42	290	No
p-Dichlorobenzene	lb/hr	1.29×10^{-3}	1.04×10^{-4}	1.39×10^{-3}	16.8	No
Dichloromethane (methylene chloride)	lb/yr	445.07	35.87	480.94	1600	No
	lb/hr	5.08×10^{-2}	4.09×10^{-3}	5.49×10^{-2}	0.39	No
Ethyl mercaptan	lb/hr	5.93×10^{-3}	7.16×10^{-5}	6.00×10^{-3}	0.025	No
n-Hexane	lb/day	0.57	6.87×10^{-3}	0.58	23	No
Hydrogen Chloride	lb/hr	-----	0.258	0.258	0.18	**YES**
Hydrogen Sulfide	lb/day	1.21	0.015	1.23	1.7	No
Mercury vapor	lb/day	5.88×10^{-5}	2.37×10^{-4}	2.96×10^{-4}	0.013	No
Methanethiol (methyl mercaptan)	lb/hr	5.01×10^{-3}	6.06×10^{-5}	5.07×10^{-3}	0.013	No
Tetrachloroethylene (Perchloroethylene)	lb/yr	226.65	18.26	244.91	13000	No
Toluene	lb/day	3.64	4.39×10^{-2}	3.68	98	No
	lb/hr	0.15	1.83×10^{-3}	0.152	14.4	No
Trichloroethylene	lb/yr	135.76	10.94	146.70	4000	No
Vinyl chloride	lb/yr	168.09	13.55	181.64	26	**YES**
Xylene	lb/day	1.29	1.56×10^{-2}	1.31	57	No
	lb/hr	5.37×10^{-2}	6.50×10^{-4}	5.44×10^{-2}	16.4	No

The toxics demonstration made in 2005 for the T02 revision resulted in the following impacts:

Pollutant	Averaging Period	Emission Rate	% AAL
Benzene	lb/yr	9.869	1.35%
Hydrogen chloride	lb/hr	0.20	0.5%
Hydrogen sulfide	lb/day	2.841	0.7%
Vinyl chloride	lb/yr	50.362	2.18%

The calculated emission rates for benzene, hydrogen chloride, and vinyl chloride exceed the previously modeled emission rates. The impacts for these pollutants were scaled to determine compliance at these higher rates. This resulted in the following impacts:

Pollutant	Averaging Period	Previous Emission Rate	Projected CY2040 Emission Rate	% AAL
Benzene	lb/yr	9.869	55.33	7.57%
Hydrogen chloride	lb/hr	0.20	0.258	0.65%
Vinyl chloride	lb/yr	50.362	181.64	7.86%

The evaluated pollutants are either below their respective TPERs or do not exceed their respective AALs, therefore no further evaluation is required. Also, since the landfill is subject to MACT and NESHAP requirements, it is exempt from permitting for toxics per 15A NCAC 02Q .0702(a)(27)(A) and (B). As such, the permit contains neither a 2D .1100 nor a 2Q .0711 toxics condition.

10. Emissions Review

Pollutant	Potential After Controls / Limitations tons/yr	Potential Before Controls / Limitations tons/yr
PM (TSP)	2.70	-----
PM_{10}	2.70	-----
$PM_{2.5}$	2.70	-----
SO_2	2.22	-----
NOx	10.94	-----
CO	59.53	-----
VOC	3.00	11.66

The facility's actual emissions as reported on the annual AQEI can be seen in the table on page one of this document.

MSW Landfill Emissions:
The landfill calculated VOC emission rates in similar fashion as the calculations made in Section 9 above. The facility's calculations were based on the sum of pollutants marked as VOC in AP-42. However, AP-42 states that VOC emissions are 39% of NMOC emissions. The landfill's methodology results in an overestimation of VOC emissions from the landfill and flare, giving the landfill a larger margin of compliance.

Flare Emissions:
VOC emission ratess for the flare were calculated in the same manner as above.

Particulate, NOx, and CO emissions were calculated using the following emission factors:

PM: 17 lb PM/10^6 ft^3 CH_4 (AP-42, Table 2.4-5)
NOx: 0.068 lb NOx/mmBtu (AP-42, Table 13.5-1)
CO: 0.37 lb CO/mmBtu (Manufacturer's Emission Factor)

$$\frac{1100\ ft^3}{minute} \times \frac{60\ minutes}{hour} \times \frac{8{,}760\ hours}{year} \times \frac{55\%\ CH_4}{100} = \frac{317.99 \times 10^6\ ft^3\ CH_4}{year}$$

$$\frac{317.99\ million\ ft^3\ CH_4}{year} \times \frac{}{1 \times 10^6} \frac{60\ minutes}{hour} \times \frac{8{,}760\ hours}{year} \times \frac{55\%\ CH_4}{100} = \frac{317.99\ million\ ft^3\ CH_4}{year}$$

Examples:

$$\frac{317.99 \times 10^6\ ft^3\ CH_4}{year} \times \frac{17\ lb\ PM}{10^6\ ft^3\ CH_4} \times \frac{1\ ton}{2000\ lb} = 2.70\ \frac{tons\ PM}{year}$$

$$\frac{317.99 \times 10^6\ ft^3\ CH_4}{year} \times \frac{0.068\ lb\ NOx}{mmBtu} \times \frac{1012\ Btu}{ft^3\ CH_4} \times \frac{mmBtu}{10^6\ Btu} \times \frac{1\ ton}{2000\ lb} = 10.94\ \frac{tons\ NOx}{year}$$

$$\frac{317.99 \times 10^6\ ft^3\ CH_4}{year} \times \frac{0.37\ lb\ CO}{mmBtu} \times \frac{1012\ Btu}{ft^3\ CH_4} \times \frac{mmBtu}{10^6\ Btu} \times \frac{1\ ton}{2000\ lb} = 59.53\ \frac{tons\ CO}{year}$$

All particulate emissions from the combustion of landfill gas are considered as $PM_{2.5}$.

To calculate potential SO_2 emissions, AP-42 Chapter 2.4 was used:

- Flare design rating = 1,100 ft^3/minute (or 31.15 m^3/min = 1,869 m^3/hour)
- Methane is only 55% of this gas stream (1,027.95 m^3/hour)
- Q_S = Emission rate of reduced sulfur compounds, m^3/hour
- C_S = Concentration of reduced sulfur compounds (46.9 ppmv, AP-42)
- Multiplication factor for 55% methane concentration in landfill gas = 100/55 (1.82)
- Molecular weight of sulfur = 32.06 g/mole

$$Q_s = 1.82 \times Q_{CH_4} \times \left(\frac{C_s}{1 \times 10^6}\right)$$ (AP-42, Equation 3)

$$Q_s = 1.82 \times 1{,}027.95\ \frac{m^3}{hour} \times \left(\frac{46.9\ parts}{1 \times 10^6}\right) = 0.088 \frac{m^3}{hour}$$

The mass of the pre-combustion sulfur compounds present in the methane were found using Equation 4 of AP-42, Section 2.4.4.2.:

$$UM_s = 0.088 \frac{m^3}{hour} \times \left[\frac{32.06 \text{ g/gmol} \times 1 \text{ atm}}{8.205 \times 10^{-5} \frac{m^3 - atm}{gmol - K} \times 1000 \frac{g}{kg} \times (273 + 25°C) \text{ K}} \right] \times 2.2 \frac{lb}{kg}$$

$$UM_s = 0.254 \frac{lb\ S}{hour}$$

To calculate SO_2 emitted from the combustion of sulfur compounds, Equation 10 of Section 2.4-8 was used:

$$SO_2 \text{ emitted} = UM_s \times \frac{\eta_{col}}{100} \times 2.0$$

Where:
UM_{cl} = Uncontrolled mass emission rate of sulfur compounds (0.254 lb sulfur/hour)
η_{col} = Collection efficiency of the landfill gas collection system, percent (assumed 100% by facility)
2.0 = Ratio of the molecular weight of SO_2 to the molecular weight of Sulfur

$$SO_2 \text{ emitted} = 0.254 \frac{lb}{hour} \times \frac{100}{100} \times 2.0 \times 8760 \frac{hours}{year} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 2.22 \frac{\text{tons } SO_2}{year}$$

11. Source Testing Information

The facility conducted Tier 2 sampling on January 29, 2019 in accordance with 40 CFR 60.764(a)(3) to demonstrate that NMOC emissions are below the threshold for which a GCCS would be required to be installed and operated. The sample resulted in a site-specific NMOC concentration of 156 ppmv as hexane. The latest results are as follows:

Emissions Year Modeled	Projected Annual Waste Acceptance Rate (Mg/Yr)	As of January 1, Current Solid Waste-in-place (Mg)	Modeled Tier 2 NMOC Emissions (Mg/Yr)
2019	93,564	3,321,993	12.0
2020	93,564	3,415,557	12.3
2021	93,564	3,509,121	12.6
2022	93,564	3,602,684	12.8
2023	93,564	3,696,248	13.0

Although the facility has demonstrated that the NMOC emission rate is below the thresholds for both NSPS XXX and MACT AAAA, since the facility has already declared itself as subject to MACT AAAA in the past, and has already been complying with the MACT AAAA requirements, and will continue to do so. DAQ has determined that the facility is required to continue to comply with MACT AAAA requirements to operate and monitor the GCCS until such time that it can demonstrate that the GCCS removal criteria are met. The facility has opted to treat the system as voluntary for the purposes of compliance with NSPS XXX and will continue to conduct Tier 2 samples

12. Statement of Compliance

The latest compliance inspection was conducted by Kurt Tidd, WaRO DAQ, on June 26, 2020. The landfill was found to be operating in compliance at that time. The landfill was issued a Notice of Deficiency on February 11, 2015 for missed surface emission monitoring in Q1 2014 and missed wellhead monitoring in July 2014. Additionally, a Notice of Violation was issued on March 31, 2017 for late submittal of the Annual Compliance Certification. All violations have been resolved.

13. Public Notice Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA.

The 30-day public notice period was from MONTH XX, 2021 through MONTH XX, 2021.

The EPA 45-day review period was from MONTH XX, 2021 through MONTH XX, 2021.

[Number of] comments were received during the public notice period and the EPA review period.

14. Comments and Recommendations

The permit renewal with modification application for the Wayne County Municipal Solid Waste Landfill located in Dudley, Wayne County, NC has been reviewed by DAQ to determine compliance with all procedures and requirements. DAQ has determined that this facility is complying or will achieve compliance, as specified in the permit, with all requirements that are applicable to the affected sources. The DAQ recommends the issuance of Air Permit No. 08885T05.

Appendix A: DAQ Responses to Questions Submitted by S+G

Question 1:
Can the portable meters manufactured by QED, LLC – Landtec (GEM-5000) or Elkins Earthworks, LLC (Envision) be approved for continued use in the wellfield?

DAQ Response:
EPA addressed the use of portable gas analyzers in its responses to public comments published in February 2020, as well as in responses to public comments made during the promulgation of NSPS Subpart XXX. Portable gas analyzers can be used, assuming these analyzers are calibrated and meet the quality assurance and quality control requirements for EPA Method 3A or ASTM D6522-11. These requirements are specifically stated in permit condition 2.1 A.5.r.ii.(C)(1) and (2), as cited within the memo.

No specific documentation for the stated portable meters was provided, but again if these analyzers are calibrated and meet the quality assurance and quality control requirements of EPA Method 3A or ASTM D6555-11, they may be used. The Wayne County Municipal Solid Waste Landfill may request a specific compliance determination if necessary for these meters.

Question 2:
Can the temperature probes/thermistors supplied with portable meters manufactured by QED, LLC – Landtec (GEM-5000) or Elkins Earthworks, LLC (Envision) be approved for continued use in the wellfield?

DAQ Response:
EPA did not specify in the final rule a particular device to be used for measuring temperature. Following the logic above, any temperature measuring device should be adequate provided that the device is calibrated annually using the procedure in Section 10.3 of EPA Method 2, as specified in the permit.

As above, no specific documentation for the probes used with the stated portable meters was provided, but if these devices are calibrated annually using the procedure in Section 10.3 of EPA Method 2, they may be used. The Wayne County Municipal Solid Waste Landfill may request a specific compliance determination if necessary for these meters.

Question 3:
Is enhanced monitoring required for wellheads that can be returned to compliance within 15 days in accordance with Condition 2.1.A.5.l.iv?

DAQ Response:
Yes. The enhanced monitoring requirements and root cause analysis/corrective action requirements cited are parallel requirements that are to be conducted concurrently, and are not dependent upon one another. Enhanced monitoring is to be conducted, starting no later than 7 days after the first measurement of LFG temperature greater than 145°F for a particular wellhead. Enhanced monitoring is no longer required if a higher operating value is approved, or if the temperature at the wellhead is less than or equal to 145°F, as stated in permit condition 2.1 A.5.r.iv.(I).

Question 4:
Is down-well temperature monitoring required to be performed during weekly/monthly enhanced monitoring? This appears to conflict with A.5.r.v, which only requires down-well temperature monitoring for wells exceeding 165°F.

DAQ Response:
These requirements are directly from the rule, and don't appear to conflict with one another. Down-well temperature monitoring is required annually and is not necessarily required to be performed during the weekly/monthly enhanced monitoring. While enhanced monitoring is required for wells with LFG temperatures greater than 145°F, down-well temperature monitoring would not be required for these wells unless the temperature continues to rise and reaches or exceeds 165°F. If during routine monitoring a well's temperature is discovered to already be greater than or equal to 165°F, enhanced monitoring, to include down-well temperature monitoring, would be required.

Question 5:
See Question 1.

DAQ Response:
This question references Question 1 but in regard to methane concentration monitoring. The memo cites specific permit condition 2.1 A.5.r.iv.(E), which states:

"Monitor the methane concentration with a methane meter using EPA Method 3C, EPA Method 18, or a portable gas composition analyzer to monitor the methane levels provided that the analyzer is calibrated and the analyzer meets all quality assurance and quality control requirements for EPA Method 3C or EPA Method 18."

As is the case with Questions 1 and 2, no specific documentation for the stated portable meters was provided, but if these analyzers are calibrated and they meet all quality assurance and quality control requirements for EPA Method 3C or EPA Method 18, they may be used. The Wayne County Municipal Solid Waste Landfill may request a specific compliance determination if necessary for these meters.

Question 6:
Will DAQ approve the use of a portable field instrument, or colorimetric sampling tube (e.g. Draeger tube)? Analytical costs related to laboratory analysis for CO is expected to exceed $250 for a standard turnaround time of 7 to 10 business days. This cost will double for faster turnaround time, depending on the lab's workload at the time. This cost does not include collection, shipping, or handling.

DAQ Response:
EPA addressed the use of colorimetric methods in its responses to public comments published in February 2020. In response to a question regarding the use of colorimetric methods, EPA cited the subjective nature of such methods, and the fact that they are susceptible to interference by other pollutants commonly present in landfill gas, such as hydrogen sulfide. Because of this, EPA chose to finalize Method 10 as the means by which carbon monoxide concentrations should be measured. Therefore, DAQ does not grant permission to use colorimetric methods in place of Method 10, as finalized in the rule.

EPA did not finalize a requirement for samples to be analyzed by an independent laboratory, recognizing logistical and cost concerns. In its responses to public comments, EPA expressly states

that since Method 10 is a performance-based method, any technology can be used as long as it can be demonstrated to meet the criteria of Method 10.

No particular "portable field instruments" other than Draeger tubes, were specified with this question, nor was specific documentation provided. Assuming that a particular technology or instrument can be demonstrated to meet the criteria of EPA Method 10, it may be used. The Wayne County Municipal Solid Waste Landfill may request a specific compliance determination if necessary for such instruments.

Question 7:
Unless alternative field monitoring methods are approved as requested in Question 6, the facility will not be able to receive CO measurement results from the lab in time to report within 24 hours of the measurement. Can alternative monitoring methods in Question 6 be approved, or can the 24-hour reporting window be extended?

DAQ Response:
As previously stated, EPA did not finalize a requirement for samples to be analyzed by an independent laboratory. The 24-hour report is a direct requirement of the rule, and DAQ cannot grant an on-going extension of the 24-hour reporting requirement in order to accommodate lab costs/turnaround times.

If the Wayne County Municipal Solid Waste Landfill has concerns regarding the ability to make a specific report within the 24-hour reporting window, the facility may petition EPA for approval.